

Dr. Abdolrasoul Rahmani

Title: Assistant Professor

Affiliation: Department of Occupational Health and Safety,
School of Health, Larestan University of Medical
Sciences, Larestan, Iran

E-mail: rahmaniabdolrasoul218@gmail.com
rahmaniabdolrasoul1988@gmail.com

Speaker Biography:

My name is Abdolrasoul Rahmani, an assistant professor in Occupational Health and Safety (OHS) at Larestan University of Medical Sciences (LUMS) in Iran. I hold a Ph.D. in OHS from Shiraz University of Medical Sciences in 2019. I have been the director of OHS department, University-Industry Relations Office and Laboratory Technical Manager at the School of Health- LUMS since 2021. My most important achievements and expertise are as follows: Has a wealth of knowledge and skill in providing technical and consultancy services in OHS risk assessment, Incident Investigation & Root Cause Analysis, Gas Chromatography (GC), High-performance liquid chromatography (HPLC), Atomic absorption spectroscopy (AAS), and Occupational Exposure Assessment. A robust professional history of working for over 10 years in OHS in Oil, Petrochemical and Gas Industry, and Research Institutions. Skilled in establishing and auditing HSE management systems, including ISO14001, ISO 45001, and HSE-MS.

Presentation Title:

Evaluation of Simultaneous Effect of Thermal Stress and Respiratory Exposure to Trichloroethylene on Liver, Kidney, Hematological Parameters and Immunological and General Health Indicators of Male Rats

Abstract:

Introduction: There are a variety of workplace environments predisposing workers to the combination of heat and chemical exposure. The present study was aimed to evaluation of simultaneous effect of thermal stress and respiratory exposure to trichloroethylene (TCE) on liver, kidney, hematological parameters and immunological and syndrome metabolic indicators of male rats

Methods: Male Sprague–Dawley rats were randomly divided into twelve equal groups of 5 animals each. Then, they were exposed to thermal stress (WBGT was $21\pm 1^{\circ}\text{C}$, $29\pm 1^{\circ}\text{C}$ and $32\pm 1^{\circ}\text{C}$) and TCE vapors (0 ppm, 10 ppm, 100 ppm, 250 ppm) in an exposure chamber with controllable conditions for sub-acute durations (8 hr/day for 10 days) according to experimental design. Blood samples were taken from the heart of all animals at the end of the 10th day of exposure. Hematology and biochemical parameters were determined using the automated cell counter and a Cobas Mira analyzer, respectively.

Results: Rats exposed to 250 ppm TCE showed a significant decrease in levels of ALB, Pr, Na, Cl, RBC, HB, HCT, PLT, IgE and lipids and a significant increase in levels of WBC, ALT, ALP, Ca, GLU, IgA, IgM and IgG ($P<0.001$). The extreme thermal stress (WBGT = $32\pm 1^{\circ}\text{C}$) significantly caused an increase in blood HB, HCT, MCV, AST, ALT, ALP, Na, CPK, LDH, GLU of the case group compared to control group ($P<0.001$). The values of K, WBC, RBC, HB, LDL and IgA significantly decreased after co-exposure 250 ppm TCE and extreme thermal stress (WBGT= $32\pm 1^{\circ}\text{C}$); although, this exposure condition led to statistically significant increase in mean levels of MCV, RDW, ALP, CPK, ALB, Pr, Cl, Ca, LDH and CPK. Moreover, the interaction of thermal stress and 10 ppm TCE for 10 consecutive days resulted in an independent effect in case of all parameters.

Conclusion: Our findings indicated that there were the antagonism and independent interactions for the hematological parameters and the additive and independent interactions for biochemical parameters based on the exposure level to trichloroethylene and thermal stress.